

Applicant: Frank T. Hartley
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Amendment to the Drawings

Please delete Fig. 7 without prejudice.

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REMARKS

Reconsideration and allowance of the above-referenced application are respectfully requested. Claim amendments are presented herein to obviate the current rejection. No new matter has been added.

Drawings

The objections to the drawings are respectfully traversed. Notwithstanding, Fig. 7 has been deleted and claim 7 has been canceled.

35 USC § 112

Claims 1-49 stand rejected under 35 USC § 112. These rejections are respectfully traversed.

With regard to the rejection of claims 1-49 under 35 USC § 112, the scope of the claims have been amended to clarify that they are directed for use with an ion thrusting system. Therefore, the alleged essential components need not be disclosed nor form a part of the recited claims.

A bipolar thruster is described in paragraph 44 which recites "In this embodiment, a bipolar ion thruster may allow reversing the electrode potentials on the ionization membrane,

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causing the electrons to pass through the membrane, while ions move behind the membrane. The high velocity ions are expelled from the front of the thruster, and electrons are expelled from the rear of the thruster. This engine can therefore be reversed in this way." This passage is more than sufficient for a skilled artisan to readily practice the claimed subject matter.

The gas flow 800 may enter in through either the upper accelerator grid or the lower accelerator grid depending on which polarity the bipolar thruster is operating.

With regard to claims 5, 21, 44, and 45, reference is made to paragraph 41 which recites "The electrons are caused to move back behind the membrane where a small electric field and magnetic field may linearly and rotationally accelerate the electron beam around to eject the electrons from the thruster with the same vector but reduced velocity as the ion beam. Since the ion and electron currents are substantially identical, this system becomes effectively charge neutral." Accordingly, the subject matter of claims 5, 21, 44, and 45, which relate to charge neutrality and the generation of ion and electron currents, should be allowable.

35 USC § 102

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Claims 1, 10, 21-24, 44, and 45 stand rejected under 35 USC § 102(b) as allegedly being anticipated by Webb. This rejection is respectfully traversed.

Claim 1 recites an apparatus for use with an ion thrusting system, the apparatus comprising: an ionization membrane having at least one area through which a gas is passed, and which ionizes the gas molecules passing therethrough to form ions and electrons; and an accelerator element which accelerates the ions to form thrust.

Claim 44 recites a method comprising the steps of: providing an ionization device having first and second electrodes spaced closer than the mean free path of molecules to be ionized; applying a potential across the first and second electrodes to generate an ionization field to ionize the molecules; and selectively diverting the ions to generate thrust.

The Webb reference does not declare how Cesium fuel is 'ionized' and suggests that the ionization is thermally induced on cesium contact with high temperature titanium (or heater covering material). However, such an arrangement fails to recite an ionization membrane as recited in claim 1, and certainly does not disclose an ionizing device having electrodes

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spaced closer than a mean free path of a molecule to be ionized as recited in claim 44.

Accordingly, claims 1, 10, 21-24, 44, and 45 should be allowable.

Claims 1, 2, 10, 21-24, 26-28, 30-32 stand rejected under 35 USC § 102(b) as allegedly being anticipated by Martin. This rejection is respectfully traversed.

Martin describes an arrangement of a semi-permeable membrane of palladium that facilitates the diffusion of hydrogen through it, and if held at sufficiently high potential and temperature, liberates protons. However, Martin fails to disclose an ionization membrane as recited in claim 1, and an ionizing device having electrodes spaced closer than a mean free path of a molecule to be ionized as recited in claim 44.

Accordingly, claims 1, 2, 10, 21-24, 26-28, 30-32 should be allowable.

Claims 1-6, 10, 21, 21-24, and 26-30 stand rejected under 35 USC § 102(b) as allegedly being anticipated by Harries. This rejection is respectfully traversed.

The Harries system does not incorporate an ionization membrane- Cesium (as with rubidium, potassium and other metallic vapors) when in contact, at high temperatures, with metals of

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higher work function (tungsten) are ionized. It is not an electric field phenomenon as recited in the claims.

Accordingly, claims 1-6, 10, 21, 21-24, and 26-30 should be allowable.

35 USC § 103

Claims 8, 45-49 stand rejected under 35 USC § 103(a) as allegedly being unpatentable over Harries in view of Hruby, Egorov, and Beattie. These rejections are respectfully traversed.

Each of the references cited in connection with this reference relate to the spacing of accelerator elements. However, the current subject matter, refer to the electrodes which are used to ionize molecules. Therefore, a skilled artisan would not have been motivated to adapt the length of an accelerator which acts upon previously-generated ions, to result in a device with electrodes which are located closer than a mean free path of said gas.

Claims 1, 2, 5-49 stand rejected under 35 USC § 103(a) as allegedly being unpatentable over Adamo in view of Hruby or Egorov. These rejections are respectfully traversed.

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Adamo deploys non-linear (sharp-tip) field emitters to generate electrons - they are not a membrane and do not produce ions or plasmas. Therefore, the skilled artisan would not have been motivated to practice the recited subject matter by combining Hruby or Egorov.

Accordingly, claims 1, 2, 5-49 should be allowable.

The rejection to claim 25 in view of Killinger is respectfully traversed.

Concluding Comments

It is believed that all of the pending claims have been addressed in this paper. However, failure to address a specific rejection, issue or comment, does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above are not intended to be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

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Applicant asks that all claims be allowed. Enclosed herewith is a credit card authorization for \$60 for a one month extension to reply the previous office action. In addition, kindly change the correspondence address for this matter as provided below.

Respectfully submitted,



Date: 10-22-05

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